

ABSTRACT

A correlation filter is provided having passbands at wavelengths corresponding to the absorption spectrum of an atmospheric gas of interest. In particular, the correlation filter features narrow, non-linearly spaced passbands having center wavelengths that are 5 correlated to the non-linearly spaced absorption lines of an atmospheric gas. A correlation filter in accordance with an embodiment of the present invention includes a compensation stack having a number of thin film layers, at least some of which have an optical thickness that is not equal to an integer multiple of one-quarter of a wavelength of an absorption line of the gas of interest. The correlation filter may be provided in 10 association with an etalon, or may comprise a number of optical cavities. In accordance with an embodiment of the present invention, a number of absorption lines associated with an atmospheric gas may be simultaneously viewed, providing a signal indicating the presence and quantity of such gas in the atmosphere having a high signal-to-noise ratio.